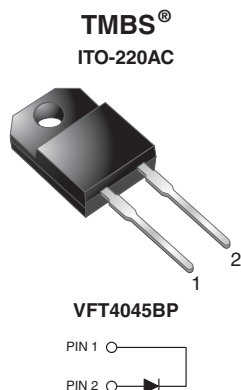


# Trench MOS Barrier Schottky Rectifier for PV Solar Cell Bypass Protection

Ultra Low  $V_F = 0.28\text{ V}$  at  $I_F = 5\text{ A}$



## FEATURES

- Trench MOS Schottky technology
- Low forward voltage drop, low power losses
- High efficiency operation
- Solder bath temperature 275 °C max. 10 s, per JESD 22-B106
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



**RoHS**  
COMPLIANT  
HALOGEN  
**FREE**

## TYPICAL APPLICATIONS

For use in solar cell junction box as a bypass diode for protection, using DC forward current without reverse bias.

## MECHANICAL DATA

**Case:** ITO-220AC

Molding compound meets UL 94 V-0 flammability rating  
Base P/N-M3 - halogen-free, RoHS-compliant, and commercial grade

**Terminals:** matte tin plated leads, solderable per J-STD-002 and JESD 22-B102

M3 suffix meets JESD 201 class 1A whisker test

**Polarity:** as marked

**Mounting Torque:** 10 in-lbs maximum

## PRIMARY CHARACTERISTICS

$I_{F(DC)}$	40 A
$V_{RRM}$	45 V
$I_{FSM}$	240 A
$V_F$ at $I_F = 40\text{ A}$	0.51 V
$T_{OP}$ max. (AC mode)	150 °C
$T_J$ max. (DC forward current)	200 °C
Package	ITO-220AC
Circuit configuration	Single

## MAXIMUM RATINGS ( $T_A = 25\text{ °C}$ unless otherwise noted)

PARAMETER	SYMBOL	VFT4045BP	UNIT
Maximum repetitive peak reverse voltage	$V_{RRM}$	45	V
Maximum DC forward bypassing current (fig. 1)	$I_{F(DC)}^{(1)}$	40	A
Peak forward surge current 8.3 ms single half sine-wave superimposed on rated load	$I_{FSM}$	240	A
Operating junction temperature range (AC mode)	$T_{OP}$	-40 to +150	°C
Isolation voltage from thermal to heatsink $t = 1\text{ min}$	$V_{AC}$	1500	V
Junction temperature in DC forward current without reverse bias, $t \leq 1\text{ h}$	$T_J^{(2)}$	$\leq 200$	°C

### Notes

(1) With heatsink

(2) Meets the requirements of IEC 61215 ed. 2 bypass diode thermal test

## ELECTRICAL CHARACTERISTICS ( $T_A = 25\text{ °C}$ unless otherwise noted)

PARAMETER	TEST CONDITIONS	SYMBOL	TYP.	MAX.	UNIT
Instantaneous forward voltage	$I_F = 5\text{ A}$	$V_F^{(1)}$	0.41	-	V
	$I_F = 20\text{ A}$		0.50	-	
	$I_F = 40\text{ A}$		0.57	0.67	
	$I_F = 5\text{ A}$		0.28	-	
	$I_F = 20\text{ A}$		0.41	-	
	$I_F = 40\text{ A}$		0.51	0.63	
Reverse current	$V_R = 45\text{ V}$	$T_A = 25\text{ °C}$	-	3000	$\mu\text{A}$
		$T_A = 125\text{ °C}$	29	85	mA

### Notes

(1) Pulse test: 300  $\mu\text{s}$  pulse width, 1 % duty cycle

(2) Pulse test: Pulse width  $\leq 40\text{ ms}$



**THERMAL CHARACTERISTICS** ( $T_A = 25\text{ }^{\circ}\text{C}$  unless otherwise noted)

PARAMETER	SYMBOL	VFT4045BP	UNIT
Typical thermal resistance	$R_{\theta JC}$	4.0	$^{\circ}\text{C}/\text{W}$

**ORDERING INFORMATION** (Example)

PACKAGE	PREFERRED P/N	UNIT WEIGHT (g)	PACKAGE CODE	BASE QUANTITY	DELIVERY MODE
ITO-220AC	VFT4045BP-M3/4W	1.75	4W	50/tube	Tube

**RATINGS AND CHARACTERISTICS CURVES** ( $T_A = 25\text{ }^{\circ}\text{C}$  unless otherwise noted)

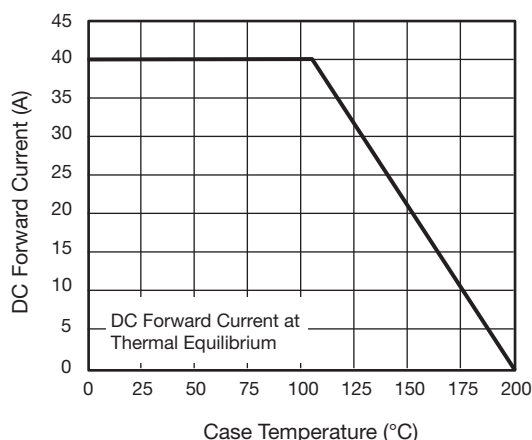


Fig. 1 - Maximum Forward Current Derating Curve

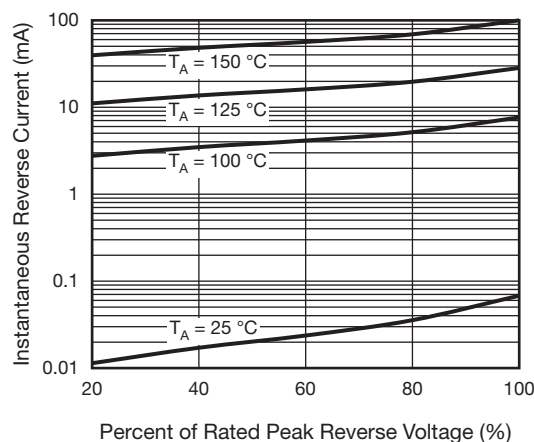


Fig. 3 - Typical Reverse Characteristics

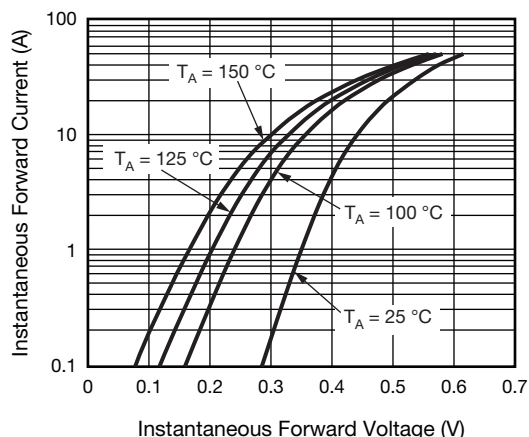


Fig. 2 - Typical Instantaneous Forward Characteristics

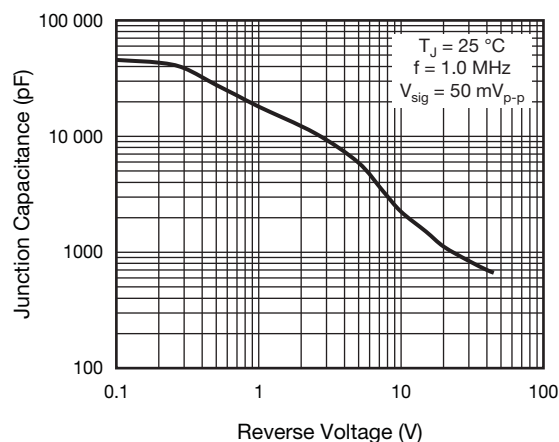


Fig. 4 - Typical Junction Capacitance

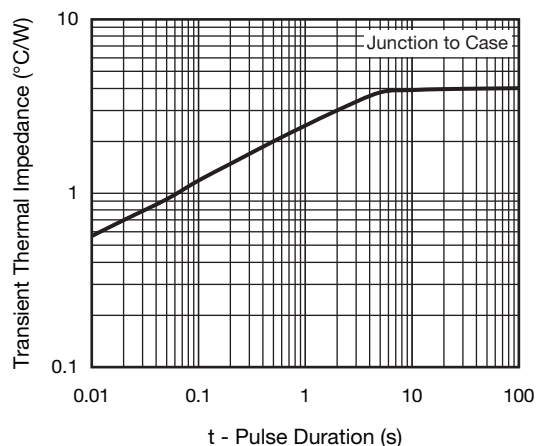
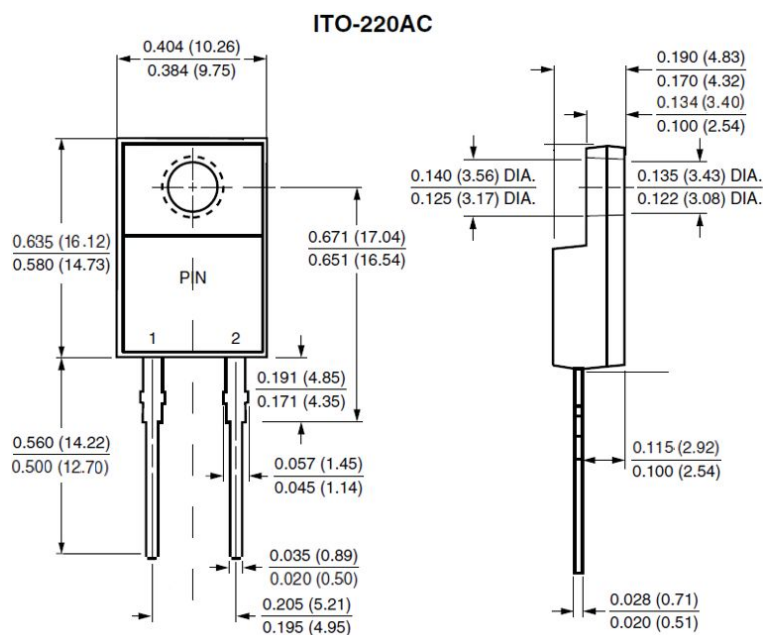


Fig. 5 - Typical Transient Thermal Impedance

**PACKAGE OUTLINE DIMENSIONS** in inches (millimeters)




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